Amendments to the Specification

Please amend the specification as follows:

[0002] In ~~optical device field~~ the optical device field, polarized light is obtained by using a polarizer which absorbs or reflects light of one polarization and transmits light of the other polarization. Therefore, polarizers may be categorized as either absorbable or reflective polarizers.

[0006] In order to achieve the object set out above, the present invention provides an optical polarized light source device. The polarized light source device comprises at least one carbon nanotube bundle, and two gold electrodes respectively connected to ends of the bundle. The bundle has a length of approximately 600 microns, and comprises a plurality of carbon naotubes bundled together and parallel to each other. Each electrode comprises at least one gold wire which is bonded to ~~inside~~ an inside of an end of the bundle by an ultrasonic wire bonder. When the polarized light source device is connected to an electrical source, a polarized incandescent light beam emits from the bundle of the polarized light source device. A direction of polarization of the light beam is parallel to the axis of the bundle.

[0007] The present invention also provides a method of fabricating the polarized light source device, the method comprising the following steps:

(1) depositing a catalyst on a substrate and patterning the catalyst such that one or more patterned catalyst regions are produced;

(2) exposing the catalyst to a carbon containing gas at a predetermined temperature such that one or more bundles of substantially parallel carbon nanotubes grow from the patterned catalyst regions in a ~~direct~~ direction substantially perpendicular to the substrate;

02/24/2005 BBONNER 00000001 10684029

[0010] Referring to FIG. 1, an optical polarized light source device of the

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present invention comprises a carbon nanotube bundle 204, and two gold electrodes 206 respectively connected to ends (not labeled) of the bundle 204. The bundle 204 has a length of approximately 600 microns, and comprises a plurality of carbon nanotubes bundled together and substantially parallel to each other. Each electrode 206 comprises at least one gold wire (not shown), which is bonded to an inside of a corresponding end of the bundle 204 by an ultrasonic wire bonder. When the polarized light source device is connected to an electrical source, a polarized incandescent light beam emits from the bundle 204. A direction of polarization of the light beam is parallel to an axis of the bundle 204.

[0011] The origin of polarization of the light beam can be qualitatively explained as follows. In the case of resistance heating filaments, a light beam is mainly radiated by moving electrons, which are accelerated by applied voltage and decelerated by lattices of the filaments. For a carbon nanotube, which is a quasi-one dimensional conductor, the movement of electrons is confined to axial directions of the carbon nanotube. Based on the theory of classical electrodynamics:

$$\mathrm{E}_\alpha = \frac{e}{c}\left[\frac{n \times (n \times \beta)}{R}\right]_{ret}$$

where E_α is the electric field vector of the light beam, e is the electron quantity, c is ~~capacitance~~ the capacitance, n is the unit vector of the direction of observation, β is the acceleration vector which is along the axial direction of the carbon nanotube, and R is the distance between the electron and the observation point. The subscript "ret" means that the quantity in the brackets is to be evaluated at the retarded potentials. The direction of observation is perpendicular to β, therefore the above formula can be reduced to:

$$\mathrm{E}_\alpha = -\frac{e}{c}\left(\frac{\beta}{R}\right)_{ret}$$

This equation shows that the electric field vector of the light beam is parallel to the axis of the carbon nanotube. That is, the light beam emitting from the resistance heating carbon nanotube is polarized along the axis of the carbon nanotube.

[0014] Firstly, a substrate is provided. The substrate includes a silicon wafer, which is two inches in diameter and 350 microns thick. The substrate is patterned with a catalyst-iron film of approximately 5nm thickness by e-beam evaporation through a shadow mask. After deposition of the iron film, the substrate is annealed in air at 300 to 500 degrees Centigrade. This annealing step oxidizes the iron film to create iron oxide nanoparticles. The substrate is then placed in a cylindrical quartz boat sealed at one end, and the quartz boat is put into the center of a 2-inch quartz tube reactor housed in a tube furnace. The furnace is heated to approximately 700 degrees Centigrade in flowing protecting gas, which is preferably argon gas. Carbon containing gas, preferably acetylene gas, is then introduced into the furnace. A plurality of carbon nanotube bundles 204 grows on patterned catalyst regions in a direction substantially perpendicular to the substrate. Lengths of the bundles 204 are approximately 600 microns, and cross-sections of the bundles 204 are approximately the same as those of corresponding patterned catalyst regions. According to transmission electron microscope observations, carbon nanotubes in each bundle 204 are well aligned, and each carbon nanotube is continuously graphitized and can be regarded as a supermolecule [[of]] 600 microns long.